Translation Certificate

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SPECIFICATION

1. Title of Invention:
DOCUMENT DISPLAY SYSTEM, DOCUMENT DISPLAY METHOD, AND PROGRAM PRODUCT

2. Detailed Description of the Invention:

[0001]

[Field of the invention]

The present invention relates to a document display system for displaying documents, and more particularly to a document display system for displaying threaded documents.

[0002]

[Background art]

In an e-mail system for exchanging documents via a network or a bulletin board system, widely documents resulting from discussions or e-mail exchanges are threaded and stored into a document database (DB). In this processing, a lot of applications are used to implement a display method for displaying titles as a document list according to a thread structure and for expanding or omitting the thread.

[0003]

Referring to Fig. 10, there is shown a diagram of a sample display of documents forming a thread. In this illustration, there are a response (reply) 1 and a response (reply) 2 to the main topic; the response 1 has a response 1-1 as a response to the response and the response 1-1 has a response 1-1-1 and a response 1-1-2 as responses to it. The response 2 has a response 2-1 as a response to the response. In a system exchanging documents via a network as described above, a document list in the thread is displayed by using a tree structure.

[0004]

As a conventional art, there is a technology for embedding a chat window into a related portion in a document for a chat and anchoring a communication client to an arbitrary position in an artifact (a related position in the document such as, for example, in a word-processor document) so as to enable a communication associated with the artifact as a communication background by supporting synchronous and asynchronous communications between individuals located in different positions (See patent literature 1, for example).

[0005]

[Patent literature 1]

Japanese Unexamined Patent Publication (Kokai) No. 142830 of 2001 (pages 11 and 12, Fig. 4)

[0006]

[Problems to be solved by the invention]

As described by referring to Fig. 10, the display method of displaying titles according to a thread structure as a document list and expanding or omitting the thread is implemented using a lot of applications. This display method has provided a certain resolution in that a relation between documents can be easily grasped. Discussions or e-mail exchanges in this method are threaded and stored into a document database. To follow a flow of the discussions or e-mail exchanges later, a user must open the documents individually to view their contents. In the conventional art, however, it was impossible to expand a document content itself on the same view as the document thread.

[0007]

More specifically, in an e-mail system or a bulletin board system for exchanging documents via a network, an original document and its return document have been treated as independent documents generated by different users, respectively. In this system, a relation

between the documents is seen as a relation in a document unit comprising the original document and its return document. On the other hand, contents of individual documents are treated as document specific attributes and consideration has never been made on a relation between contents of a plurality of documents. Therefore, as a terminal function of providing a view of documents, a relation between documents such as the original document and the return document has been presented to a user, but the contents of the documents have not been presented as those related to each other. In other words, the document contents themselves have not been expanded on the same view as the document thread as shown in Fig. 10. As a result, to check discussions or e-mail exchanges later, individual documents need be opened individually and their contents need be checked, by which a user finds the operation complicated and it becomes hard to grasp the entire content.

[0008]

Additionally as a conventional art described in the above patent literature 1, there is disclosed a technology for making a display in a condition where an object of chat is appropriately associated with the chat by embedding a chat window (it is associated with an anchor) into a related portion in a document for the chat (a word-processor document, for example). With an application of this technology, however, it is hard to expand the contents of the documents on the same view (the same window) as the document thread.

[0009]

On the other hand, a technology for displaying a document as an outline has existed conventionally and it is used in a word processor, for example. This technology, however, is to display a document by outlining the document structure in the single document, but has not been used to

combine a plurality of threaded documents such as documents exchanged via a network into a single document.

[0010]

The present invention has been disclosed to resolve the above technological problem. It is an object of the present invention to provide an easy understanding of a relation between documents and to enable a user to view documents in a required range at a time in documents exchanged via a network and threaded documents.

[0011]

[Means for solving the problems]

To accomplish these objects, the present invention enables an easy understanding of a relation between documents and an acquirement of a virtual document providing a concurrent view of only documents in a required range by combining documents in a thread to generate the virtual document and reflecting the relation between the documents as a relation between sections in the virtual document. More specifically, according to an aspect of the present invention, there is provided a document display system, comprising: a document storage unit for storing a group of documents exchanged via a network, a related information storage unit for storing mutual related information in the group of documents stored in the document storage unit, and a display document generation unit for reading out related information stored in the related information storage unit to form a section group and generating a display document by embedding the document read from the document storage unit into a given section which is a component of the section group.

[0012]

In the above, the display document generation unit forms the section group by embedding a document header and a level indicating a depth of hierarchy from the main document and the related information storage unit stores

information of a parent document related to a given document.

[0013]

According to another aspect of the invention, there is provided a document display system, comprising: a message storage unit for storing messages forming a thread, an index storage unit for storing information on a thread composition in the messages, and a display document generation function of generating a section corresponding to the index by fetching an index of the message from the index storage unit, wherein the display document generation function is used to invoke a given message from the message storage unit and to add it to a display document by embedding the message into the section.

[0014]

Additionally, the system further comprises an expansion condition storage unit for storing an expansion condition of the message, wherein the display document generation function generates a section by fetching an expansion condition of the message from the expansion condition storage unit. Furthermore, it further comprises a user interactive processing function of accepting an expansion request to a header from a user, wherein the display document generation function is used to add the given message to the display document on the basis of the expansion request accepted by the user interactive processing function.

[0015]

On the other hand, according to still another aspect of the invention, there is provided a document display method, comprising the steps of: acquiring related information between documents in a thread from a storage device, generating a section group based on the related information acquired from the storage device in a virtual document, reading a document corresponding to a given

section which is a component of the section group from the storage device, and embedding the read document into the section and adding it to a display document.

[0016]

In the above, the section group is generated from a group of documents exchanged via a network and the documents in the thread are a collection of documents whose editing is not scheduled. Furthermore, the step of acquiring the related information between documents in the thread includes extracting a relation between documents as a tree structure and the step of generating the section group in the virtual document includes generating the section group by using the extracted tree structure.

[0017]

According to still another aspect of the invention, there is provided a document display method, comprising the steps of: combining documents exchanged via a network with each other and storing headers of the documents into a memory with keeping a relation between the documents, storing a document corresponding to a given header stored in the memory with keeping the relation between the documents into the memory, and outputting a content stored in the memory as a display document. More specifically, the step of storing the headers of the documents into the memory includes generating a section group having a tree structure in a virtual document and the step of storing the document into the memory includes storing a content of the document corresponding to the given section with keeping the tree structure.

[0018]

These aspects of the invention can be understood as programs for causing a server such as a bulletin board server or e-mail client or other computers to perform these functions. More specifically, according to an aspect of the invention, there is provided a program for enabling a

computer to provide the functions of: storing related information between documents into a storage device, acquiring the related information between the documents in a thread, generating a section group based on the acquired related information in a virtual document, reading a document corresponding to a given section which is a component of the section group from the storage device, and embedding the read document into the section and adding it to a display document.

[0019]

In the above, the function of acquiring the related information between the documents in the thread includes extracting a relation of the documents as a tree structure, the function of generating the section group in the virtual document includes generating a section group having the extracted tree structure, and the function of adding the document to the display document includes adding the document with keeping the tree structure.

[0020]

According to still another aspect of the invention, there is provided a program for enabling a computer to provide the functions of: combining documents exchanged via a network and storing headers of the documents with keeping a relation between the documents into a memory, storing a document corresponding to a given header stored in the memory with keeping the relation between the documents into the memory, and outputting a content stored in the memory as a display document. More specifically, the function of storing the headers of the documents into the memory includes generating a section group having a tree structure in a virtual document and the function of storing the document into the memory includes storing a content of the document corresponding to a given section with keeping the tree structure.

[0021]

These programs can be provided in a form of programs installed in a computer when the computer is supplied to a customer or in a form of programs computer-readably stored in a storage medium so that the computer executes the programs. The storage medium is a CD-ROM, for example. A CD-ROM reader or the like reads programs and a flash ROM or the like stores these programs for execution. Furthermore, these programs may be provided via a network using a program transmission device, for example. The program transmission device is arranged in a server on the network, for example, and comprises a memory storing the programs and a program transmission unit for providing the programs via the network.

[0022]

[Preferred embodiment of the invention]

The preferred embodiments of the present invention will now be described in detail hereinafter with reference to the accompanying drawings.

Referring to Fig. 1, there is shown an overall configuration of a document display system 1 according to this embodiment. In the document display system 1, a terminal (a Web browser, etc.) 3 formed by a computer such as a personal computer (PC) is connected to a server 10 providing the display document to the terminal 3. The document display system 1 shown in Fig. 1 is applicable to a bulletin board system, for example. In the bulletin board system, a computer (server computer) managed by a provider, for example, operates the server 10, which stores and manages messages transmitted via the network 2 in a database. Additionally a content of the database is supplied to the terminal 3 that is a user computer accessing the server 10.

[0023]

The terminal 3 is one of computers scattered in a wide area operated by users. The user of the terminal 3

uses the terminal 3 for registering or browsing messages (documents). The terminal 3 then accesses the server 10 via the network 2 to send for a WWW page of an application form generated by an organizer of the bulletin board, for example. The user fills in his or her personal information (his or her own e-mail address, etc.) on the page with an item such as a title on the bulletin board for requesting an acquirement of information and transmits it to the server 10. In this embodiment, the user can request the message list at the terminal 3.

[0024]

The server 10 is a computer for totally managing the entire bulletin board system and is connected to the network 2 such as the Internet to function as a WWW server and an e-mail server. It generally comprises a processing function unit 20 and a storage unit 30. The processing function unit 20 is realized in a structure of a CPU and a main storage (memory) in a computer, for example. In this embodiment, it has a user interactive processing function 21 accepting a request from the user operating the terminal 3 via the network 2, a display document generation function 22 generating a section by fetching an index of a message and referring to a tree structure of the message as a display document generation unit, and a message registration function 23 registering the acquired message such as a response message. In the above, the term "section" means a set of documents or a single "item unit" covering a given header to the next header. It also includes a meaning of a document format such as a multiple column structure.

[0025]

In the display document generation function 22, documents in a thread are combined to generate a virtual document. At that time, a relation between documents is reflected as a relation between sections in the virtual

document. The virtual document is stored in the memory in the computer or stored as a file on a hard disk drive (HDD). The generated virtual document is returned to the user interactive processing function 21 as a display document and then the user interactive processing function 21 sends out the display document to the terminal 3.

[0026]

The storage unit 30 is a database managed by the server 10 and it is formed by an external storage such as, for example, a hard disk drive (HDD). In this embodiment, it comprises an expansion condition storage unit 31 storing an expansion condition such as presence or absence of a message according to a header, a message storage unit 32 storing contents of actual messages as a document storage unit, and an index storage unit 33 storing message index information such as, for example, parent message information to a given title as a related information storage unit.

[0027]

Referring to Figs. 2A to 2C, there are shown diagrams illustrating examples of information stored in the storage unit 30. Fig. 2A shows a content recorded by the expansion condition storage unit 31. Fig. 2B shows a content recorded by the message storage unit 32. Fig. 2C shows a content recorded by the index storage unit 33. As shown in Fig. 2A, the expansion condition storage unit 31 records the presence or absence (Y/N) of an expanded header and the presence or absence (Y/N) of an expanded message in association with identification information (ID). As shown in Fig. 2B, the message storage unit 32 stores the acquired message contents themselves in association with the identification information (ID). As shown in Fig. 2C, the index storage unit 33 stores relations between titles and parent message IDs in association with the identification information (ID). In connection with the titles, the

structure between documents is a tree structure including a main topic, its type, a response number indicating what number response it is, for example.

[0028]

The indices stored in the index storage unit 33 shows a thread structure of threaded documents. The term "thread" here means a series of messages written on a specific topic or a small bulletin board for discussing a common theme. A "thread" of messages simply displays a relation between an original message and messages returned to it. It is easier to understand if the thread is grasped in a parent-child relation. A response to a "parent" message generates a "child" message. If a plurality of responses are returned to the parent message, all of these return messages can be considered to be in a brother relation.

[0029]

The following describes a processing procedure in the document display system 1.

Referring to Fig. 3, there is shown a flowchart of processes of a document display method according to this embodiment. In the flowchart, processes between the terminal 3 and the server 10 are described as a processing flow. First, a user requests a message list at the terminal 3 (step 101). The server 10 accepts the request in the user interactive processing function 21 (step 102) and requests the display document generation function 22 to generate a display document. The display document generation function 22 executes the display document generation process by using information stored in the expansion condition storage unit 31, the message storage unit 32, and the index storage unit 33 (step 103). Thereafter, the generated display document is returned from the display document generation function 22 to the user interactive processing function 21 and the user interactive

processing function 21 transmits the display document to the terminal 3 via the network 2 (step 104).

[0030]

The terminal 3 receives the display document (step 105) and displays it on a screen of a display unit by using its own browser, for example. In response to the display document output to the display unit, the user issues an instruction for expanding or folding a specific section by using the terminal 3 (step 106). In the server 10, the user interactive processing function 21 accepts the request via the network 2 (step 107) and updates the expansion condition stored in the expansion condition storage unit 31 (step 108). The user interactive processing function 21 requests the display document generation function 22 to generate a display document and the display document generation function 22 generates the display document on the basis of the updated expansion condition (step 109). Thereafter, the generated display document is returned from the display document generation function 22 to the user interactive processing function 21 and the user interactive processing function 21 transmits an output of a display document including a specific section expanded or folded, in other words, this display document to the terminal 3 via the network 2 (step 110).

[0031]

The terminal 3 receives the display document (step 111) and outputs the received display document on a screen by using its own browser, for example. Thereafter, it is determined whether the section expansion or folding is necessary (step 112). If so, the control returns to the step 106. Otherwise, the processing terminates. A series of these processes are executed with an application program in the server 10 as a computer.

[0032]

The following describes display document

generation processing by using Figs. 4 and 5.

Referring to Fig. 4, there is shown a flowchart of display document generation processing executed by the display document generation function 22 in the steps 103 and 109 shown in Fig. 3. Referring to Figs. 5A to 5C, there are shown explanatory diagrams of assistance in explaining the display document generation processing. In the display document generation function 22, an index is fetched first from the index storage unit 33 (step 201) and a message is fetched from the message storage unit 32 (step 202). From the content of the index storage unit 33 shown in Fig. 2C, it is understood that the extracted relation between the documents has a tree structure as shown in Fig. 5A.

[0033]

Subsequently, a section corresponding to the index is generated (step 203). In the section generation, a header and a level (a depth of the tree structure from the main message) are first embedded in the section (step 211). In this embodiment, as shown in Fig. 5B, for example, a section group corresponding to the extracted tree structure is generated in a virtual document. Subsequently, an operation icon is embedded in the section (step 212). Examples of the operation icon are shown in Fig. 5C. The operation icon shaped as a rightward triangle indicates an omitted thread and the operation icon shaped as a downward triangle indicates an expanded thread. The operation icon with a mark "+" indicates that a content of a sentence is not expanded and the operation icon with a mark "-" indicates that a content of a sentence is expanded. Providing these operation icons enables the user of the terminal 3 to issue an instruction for expanding or folding a specific section, for example. There can be wide variations among these user interfaces. For example, it is also possible to add all expanded, all folded, or other

functions.

[0034]

Thereafter, the display document generation function 22 fetches an expansion condition of the corresponding message from the expansion condition storage unit 31 (step 213). The expansion condition storage unit 31 stores information of whether messages have already been expanded in association with document IDs after an expansion of the instruction of the expansion or folding based on the operation of the above operation icons, for example. The display document generation function 22 fetches a message from the message storage unit 32 and embeds it in the section if the message is expanded determining from the read expansion condition (step 214).

[0035]

After the section corresponding to the index is generated in this manner, the display document generation function 22 adds the generated section to the display document (step 204). If the message is not expanded as the expansion condition in the above, section generation processing for the lower response messages is aborted (step 205) and the display document generation processing terminates. Note that the display document can be written in HTML.

[0036]

Referring to Fig. 6, there is shown a diagram of an example of a thread display in the virtual document generated as described above. In this embodiment, it is displayed by using a display mechanism supporting the section omission and expansion. This enables an easy grasp of a relation between documents and a display where only documents in a required range can be viewed at a time. Note that a text of an individual document need not always be present statically in the virtual document, but it is also possible to have only a pointer (ID) to a text of a

document in the original document database (message storage unit 32) from the index information of the virtual document. The virtual document itself need not be a permanent file existing on the HDD, but can be an object temporarily generated on the memory.

[0037]

While the server 10 executes the section expansion or omission processing in the above description, it is also possible to control the section expansion or omission processing in the terminal 3. In this case, processing is the same as the above in the server 10 up to the step of embedding the section in the virtual document based on the dependency of the message. Note that, however, the server 10 is assumed not to manage the expansion nor omission condition on the display. More specifically, all messages of the thread in the range of browsing are embedded as a section in the virtual document when the section is embedded. The terminal 3 performs the section expansion or omission by controlling the display or non-display of a section specified by the user. This configuration enables the control of the display or non-display of the section by making full use of JavaScript™ when using a terminal function including a section display/non-display function or when using a Web browser instead of the terminal 3.

[0038]

The following describes this embodiment by using a concrete example of a document.

Referring to Fig. 7, there is shown a concrete example of a list of document titles. The documents treated here are those exchanged via the network 2; documents in the thread are identified by headers as document titles. The triangle is an operation icon and indicates that response documents to each document exist and that they are threaded. Consideration is made here for a case where a user wants to view documents in the thread

beginning with "About Development Program for Product A." In the conventional method, there has been a need for selecting individual documents and displaying the documents one by one. Although conventionally it was possible to open a plurality of windows and to display a plurality of documents at a time, the current display documents need be closed to display new documents if the number of documents increases due to a limitation on the number of windows that can be displayed on the display at a time in practical use. This leads to a complicated operation and a loss of the user's train of thought due to a shift between the documents. Furthermore, it is hard to grasp the relation between documents displayed on the window. In other words, it was hard to grasp contents by viewing the entire thread in the conventional method.

[0039]

To the contrary, the document thread and the contents of the documents can be viewed on the same view in this embodiment.

Referring to Fig. 8, there is shown a diagram of a sample view of contents of combined documents. Fig. 8 shows an example displayed when viewing the documents in the thread in Fig. 7. For example, it is possible to select "About Development Program for Product A" as a root document in the window in Fig. 7 and then to depress the "display all" button for displaying the document. Furthermore it is possible to display all documents (including "About Operation Plan for Former Term" and "About Response to Production Adjustment Request") in a form as shown in Fig. 8 from the start to expand the contents on the same view.

[0040]

In the example shown in Fig. 8, it is assumed that the document content expansion and the document thread expansion can be specified independently. For example, if

the "thread expansion" button is depressed, a thread of a response document to the document is expanded, but the document content itself is not expanded. If the "content expansion" button is depressed, the document content (sender, date and time, and text) is expanded and displayed. Therefore, the icons indicating the expansion conditions are provided with given meanings as shown in Fig. 5C. This combination is achieved by mapping between a virtual document and an entity document as described above.

[0041]

While the document display system 1 has been described by referring to Fig. 1 and after by giving an example of a bulletin board system, the present invention is also applicable to an e-mail system in the same manner.

Referring to Fig. 9, there is shown a diagram of a functional block of an e-mail system to which this embodiment is applied. The server 10 shown in Fig. 1 corresponds to an e-mail client 11. It transmits or receives a message to or from an e-mail server 4 instead of the terminal 3 shown in Fig. 1. The e-mail client 11 shown in Fig. 9 is basically the same as the server 10 shown in Fig. 1 except that it has message transmitting and receiving functions additionally.

[0042]

A processing function unit 20 in the e-mail client 11 shown in Fig. 9 comprises a message receiving function 25 receiving a message from the e-mail server 4 via a network 2, a message transmitting function 26 transmitting a message to the e-mail server 4, and a screen display function 27 displaying a display document generated by a display document generation function 22 on a screen as an output unit of the display document according to an instruction from a user interactive processing function 21. Components of a storage unit 30, in other words, an expansion condition storage unit 31, a message storage unit

32, and an index storage unit 33 are the same as those in Fig. 1. The above components are provided besides those in Fig. 1 since an e-mail is often downloaded to the e-mail client 11 and managed in the e-mail system. If a user of the Web browser exists as a client, the network 2 exists between the screen display function 27 and the user interactive processing function 21. In this case, still there is no change in the functional block itself.

[0043]

As described in detail hereinabove, in this embodiment a virtual document is generated by combining documents within a thread and a relation between the documents is reflected as a relation between sections in the virtual document, thereby enabling an easy grasp of the relation between the documents and obtaining a virtual document where only documents in a required range can be viewed at a time. More specifically, a relation between documents in a thread is extracted as a tree structure, for example, and a section group having the same tree structure is generated in a virtual document on the basis of the extracted tree structure before mapping of the relation between the documents. Thereafter, contents of documents corresponding to respective sections are mapped and displayed. In this manner, the mechanism for mapping a plurality of documents into a single virtual document is provided in this embodiment. The display in this embodiment is not a document list, but the content itself of the virtual combined document can be seen. Furthermore, even if a section is treated as an object embedded in a higher sentence as one in a nested structure, for example, relations between independent documents can be mapped into a single document without expanding a text of the higher document.

[0044]

[Advantages of the invention]

As set forth hereinabove, according to the present invention, relations between documents of threaded documents can be easily grasped and it becomes possible to view documents in a required range at a time.

3. Brief Description of the drawings:

Fig. 1 is an overall configuration showing a document display system according to the embodiment;

Figs. 2A to 2C are diagrams showing examples of corresponding information stored in storage units;

Fig. 3 is a flowchart showing processing of a document display method according to the embodiment;

Fig. 4 is a flowchart showing display document generation processing executed by a display document generation function shown in steps 103 and 109 in Fig. 3;

Figs. 5A to 5C are explanatory diagrams of assistance in explaining the display document generation processing;

Fig. 6 is a diagram showing an example of a thread display of a generated virtual document;

Fig. 7 is a diagram showing a concrete example of a list at a document title;

Fig. 8 is a diagram showing a sample view of contents of the combined documents;

Fig. 9 is a functional block of an e-mail system according to the embodiment; and

Fig. 10 is a diagram showing a sample display of documents forming a thread.

4. Claims:

1. A document display system, comprising:

document storage means for storing a group of documents exchanged via a network;

related information storage means for storing related information in the group of documents stored in said

document storage means; and

display document generation means for forming a section group by reading out related information stored in said related information storage means and generating a display document by embedding the document read from said document storage means into a given section which is a component of the section group.

2. The system according to claim 1, wherein said display document generation means forms said section group by embedding a document header and a level indicating a depth of hierarchy from a main document.

3. The system according to claim 1, wherein said related information storage means stores information of a parent document related to a given document.

4. A document display system, comprising:

a message storage unit for storing messages forming a thread;

an index storage unit for storing information on a thread composition in the messages; and

a display document generation function of generating a section corresponding to the index by fetching an index of the message from said index storage unit,

wherein said display document generation function is used to invoke a given message from said message storage unit and to add it to a display document by embedding the message into the section.

5. The system according to claim 4, further comprising an expansion condition storage unit for storing an expansion condition of said message, wherein said display document generation function generates a section by fetching an expansion condition of said message from said expansion condition storage unit.

6. The system according to claim 4, further comprising a user interactive processing function of accepting an expansion request to a header from a user,

wherein said display document generation function is used to add said given message to said display document on the basis of said expansion request accepted by said user interactive processing function.

7. A document display method, comprising the steps of:

acquiring related information between documents in a thread from a storage device;

generating a section group based on said related information acquired from said storage device in a virtual document;

reading a document corresponding to a given section which is a component of the section group from the storage device; and

embedding the read document into the section and adding it to a display document.

8. The method according to claim 7, wherein said section group is generated from a group of documents exchanged via a network.

9. The method according to claim 7, wherein said documents in the thread are a collection of documents whose editing is not scheduled.

10. The method according to claim 7, wherein said step of acquiring the related information between documents in the thread includes extracting a relations between documents as a tree structure and wherein said step of generating the section group in the virtual document includes generating the section group by using the extracted tree structure.

11. A document display method, comprising the steps of:

combining documents exchanged via a network with each other and storing headers of the documents into a memory with keeping a relation between the documents;

storing a document corresponding to a given header

stored in the memory with keeping the relation between the documents into the memory; and

outputting a content stored in the memory as a display document.

12. The method according to claim 11, wherein said step of storing the headers of the documents into the memory includes generating a section group having a tree structure in a virtual document.

13. The method according to claim 12, wherein said step of storing the document into the memory includes storing a content of the document corresponding to the given section with keeping said tree structure.

14. A program product for enabling a computer to provide the functions of:

acquiring related information between documents in a thread;

generating a section group based on the acquired related information in a virtual document;

reading a document corresponding to a given section which is a component of the section group from a storage device; and

embedding the read document into the section and adding it to a display document.

15. The program product according to claim 14, further enabling said computer to provide a function of storing said related information between the documents into a storage device.

16. The program product according to claim 14, wherein said function of acquiring the related information between the documents in the thread includes extracting a relation of the documents as a tree structure, wherein said function of generating the section group in the virtual document includes generating said section group having the extracted tree structure, and wherein said function of adding the document to the display document includes adding

said document with keeping the tree structure.

17. A program product for enabling a computer to provide the functions of:

combining documents exchanged via a network and storing headers of the documents with keeping a relation between the documents into a memory;

storing a document corresponding to a given header stored in the memory with keeping the relation between the documents into the memory; and

outputting a content stored in the memory as a display document.

18. The program product according to claim 17, wherein said function of storing the headers of the documents into the memory includes generating a section group having a tree structure in a virtual document and wherein said function of storing the document into the memory includes storing a content of the document corresponding to a given section with keeping the tree structure.

DOCUMENT DISPLAY SYSTEM, DOCUMENT DISPLAY METHOD, AND PROGRAM PRODUCT

[Document Type] Abstract

[Abstract]

[Object] It is an object of the present invention to provide a facility of grasping a relation between threaded documents and to make it possible to view documents in a required range at a time.

[Constitution] A document display system comprising a message storage unit 32 for storing messages forming a thread, an index storage unit 33 for storing information on a thread composition in the messages, an expansion condition storage unit 31 for storing the condition in which a message is expanded, and a display document generation function 22 of fetching an index of a message from the index storage unit 33, fetching the expansion condition of the message from the expansion condition storage unit 31, and generating a section corresponding to the index, wherein the display document generation function 22 is used to invoke a given message from the message storage unit 32 and to add it to a display document by embedding the message into the section.

[Selected Drawings] Fig. 1